



GEORGE H. W. BUSH FOUNDATION
FOR U.S.-CHINA RELATIONS

乔治布什美中关系基金会

Bush China Foundation Brief: Report on U.S.-China Roundtable on Digital Health Technologies

By Zoe Leung | December 2021

The COVID-19 pandemic has led to a massive acceleration in the use and general acceptance of telehealth and, more broadly, virtual healthcare. Nevertheless, more than a year after the pandemic started, the benefits of leveraging digital health technologies to enhance patient outcomes remain highly unequal. In many ways, the pandemic has set the world's two largest economies, the United States and China, on a similar path, where the new realities of technology in health care are both creating new opportunities and exposing longstanding challenges.

How have digital technologies affected the overall health care landscape and equity in the United States and China? In examining the policy implications of digital health innovation in different settings, how can both nations translate the lessons learned in 2021 to a better future in 2022 and beyond? To answer these questions, the George H. W. Bush Foundation for U.S.-China Relations (Bush China Foundation) convened a U.S.-China Roundtable on Digital Technologies and Urban-Rural Health to discuss the implications and lessons learned from implementing health technologies in the two countries, in coordination with the Chinese Academy of Science and Technology for Development (CASTED).

DIGITAL SOLUTIONS FOR RURAL HEALTH

Lessons learned in the United States

Prior to the COVID-19 outbreak, the use of telehealth was limited, hampered in large part by government regulations on reimbursements and the cost structure, with charges incurred for both the originating site (where the patient was located) and the distance site-provider (where the physician was located). The pandemic accelerated a rethink of the clinical paradigm to better realize the technology's full capabilities, with the expedited adoption of telehealth connecting hospitals and patients in unprecedented ways. This increased interest in telehealth has the potential to be particularly transformative for rural America, where access to healthcare is often much more limited than in urban areas. But it remains to be seen whether the changes in medical teams and physical environments instituted during the pandemic were truly effective in shifting the approach to healthcare away from the traditional clinical intervention model to improve health overall, beyond addressing only acute health care needs.

An example of a successful rethinking of the clinical paradigm and implementation of telemedicine is in one of the United States' least populous counties. Ninety miles from the closest hospital, this community had generally been dependent on their sole physician for 24-7 healthcare services, an arrangement that had become unsustainable for the doctor. Through telehealth, paramedics and EMTs stepped in to back-up the local physician, providing after-hours coverage and emergency response. Looking forward, digital technologies also could be leveraged in behavioral health and substance abuse follow-up treatments, including peer recovery and support services, crisis services and direct-to-the-consumer coverage for primary care.

Lessons learned in China

China has made considerable progress with health informatization since 2006 when the first national informatization development strategy for 2006-2010 was released. The government has rolled out a national strategy to encourage digital health development in areas including e-hospitals, telemedicine, conversion of national health records to electronic versions and the implementation of the population health information system. Studies indicate that patient confidence in digital health has grown, with 97 percent of those surveyed expressing a willingness to use the service as long as it is covered by insurance.

Rural China, however, has lagged behind the national progress in health informatization due to the uneven distribution of health care resources with advanced diagnostic equipment and treatment and the best doctors concentrated in major cities. Compounding these structural barriers is the high concentration of elderly in rural areas: only 23.85 percent of people aged 60 and older in China have access to the internet, not to mention overall digital illiteracy.

The private sector has been experimenting with ways to narrow these gaps. One example is the use of artificial intelligence (AI) to increase diagnostic efficiency and accuracy. In rural China, village clinics and community hospitals face a severe shortage of skilled health practitioners, and workforce training has failed to address this shortcoming. A new AI-based system creates question sets about the patients' symptoms, identifies gaps in patients' medical records and suggests possible diagnoses. This system creates a more efficient initial intake session and provides the physician with suggested diagnoses beyond the short list of most common ailments, thus increasing the primary care physician's clinical knowledge and capabilities. Another example is the use of AI to automate chronic disease management. Used by patients with hypertension, this system codes patients as low, medium or high risk, based on blood pressure readings taken by the patients at home. The system then analyzes the information and generates reminders and suggests actions according to the level of risk. For high-risk patients, the system notifies the physician to intervene and provide in-person consultation. Although challenges in collecting accurate data of elderly patients and integrating other measurements for effective monitoring of rural patients persist, the system has proven effective in significantly reducing both systolic and diastolic blood pressure among users.

The case for U.S.-China collaboration

The COVID-19 pandemic has set the United States and China on similar paths in the use of digital technologies to lower costs and address disparities in rural areas. The U.S. has been grappling with providing high-quality health care in places lacking highly skilled professionals, a problem most countries face and one that China is increasingly concerned about. Even before the pandemic, China has been pushing for more public and private investments in digital health technologies, including e-hospitals and telemedicine. Accordingly, it is well-positioned to share the results and lessons from their experimentation with different models, particularly in contrast to the United States, which had been experiencing underinvestment in the same area until COVID-19 created the necessary incentives for hospitals to step up investment. Both countries also face common behavioral barriers and market-driven factors that will either allow or prevent them from taking full advantage of technological advancement to expand access. The two nations both have success stories and experiences to share and to draw on, and hence this area has the potential for robust collaboration.

SMART CITY SOLUTIONS FOR URBAN HEALTH

Lessons learned in the United States

In the United States, as the population increases faster than the healthcare system's ability to provide care, the demand for healthcare will see dramatic changes in the future. The system is oriented around addressing acute exacerbations but lacks the capacity to manage chronic diseases. On the other hand, digital technologies now permeate every facet of our lives, including for healthcare purposes. Technology companies are increasingly becoming actively involved in healthcare. For instance, two new features of the Apple Watch, electrocardiogram (EKG) and irregular heart rhythm detections, now make it possible for wearers to acquire data anytime that previously could only be done in a hospital. This is just one example of how technologies are enabling what was previously impossible, generating possibilities of providing healthcare and addressing disparities in entirely new ways.

Smart communities for health: As the same approaches in cities are also applicable to in rural areas, the idea of smart communities for health builds on the concept of smart cities and are communities—both urban and rural—built with health as the core consideration in its planning and implementation. The concept centers around developing a system that can interact and engage with all interfaces that patients rely on to optimize and improve their health.

New realities of technology: Thus far, technologies in healthcare have been used primarily to optimize clinical practices, which have not sufficiently addressed inequities. In contrast, residents in smart communities benefit from a system that gathers constant data to predict their physical needs and adjusts their environments before they even realize an action is required, shifting where healthcare is provided. One example is to embed sensors in the walls and ceilings of a home to gather data around the clock on chronic diseases for early detection and treatment. For patients with asthma, as an example, the sensors would be able to pick up increased difficulty in breathing, send signals to the cloud and register an impending asthma attack. The same system would then raise the humidity level in the room and spray inhalation treatment to prevent an asthma attack before it even materialized.

This is the concept of “connected healthcare,” whereby digital technologies and health-related data are centered around patients' needs and the provision of care in the most proactive and effective manner possible. Affordability, accessibility, identification of the right technology and incentivization of investment, among others, present challenges in implementation. Increased connectivity can either bring people together or cause divisions. To coherently adopt “connected healthcare” that relies on sharing data, trust is essential. Yet, the potential for extraordinary benefits for everyone is significant, if the challenges can be overcome.

Lessons learned in China

After four decades of rapid economic development and urbanization, China is now focused on pursuing innovation and breakthroughs in key technologies to achieve high-quality growth. Promoting environmentalism and addressing inequities and the urban-rural development gap are a key piece, with a “smart city” as a crucial approach, has sparked experimentation in the private sector. Currently, 300 of China's 670 cities are pilot “smart cities”, covering all provinces. “Smart healthcare” is a key feature focused on areas that were previously impossible, such as

making medical insurance plans transferable between provinces. Challenges remain, including the lack of a nationally integrated medical insurance system and interoperability between services offered by different technology companies, optimization of health data collection, further AI development to enable remote diagnoses, cultivation of an interdisciplinary workforce, empowering of community hospitals and restriction of unethical capitalization of data assets by tech companies.

“City Brain”: In China, the concept of “city brain” is widely referred to as an AI-enabled “smart city” system that integrates data, cloud computing and digital technologies to optimize urban resources and improve governance efficiency. Examples of the application include a mobile health code to track the spread of the COVID-19 pandemic and an early warning system for elder care in Hangzhou city, a high-technology hub in the Zhejiang province. At the onset of the pandemic, the city swiftly developed a health code system to segment residents into three risk levels based on their travel, address and health status over the preceding 14 days, which became instrumental in the resumption of factory productions and other aspects of the economy. In the second instance, data collected by the city showed that energy consumption and living habits are closely linked and that anomalies in electricity consumption patterns could be helpful in detecting potential health and safety risks for seniors who live alone. With these findings, the city developed a 24-hour warning system that monitors electricity consumption and alerts and prompts the community management team to act when anomalies are detected.

CONCLUSION AND ACKNOWLEDGEMENTS

The COVID-19 pandemic has laid bare longstanding health inequities in both the United States and China. As both countries grapple with the equity question, digital technologies present massive opportunities to connect and link urban and rural areas and to provide better healthcare for the most vulnerable populations in a sustainable way. Given the many lessons and policy implications to examine in this area, this roundtable discussion serves as a stepping stone for the Bush China Foundation to further explore the role of digital technologies in bridging the urban-rural health divide and improving the health of underserved populations in both the U.S. and China.

This report draws upon experiences and expertise in academia and multinational businesses from both the United States and China. Special thanks to the content experts who participated in our roundtable discussion, including Bush China Foundation Advisor Dr. Gordon Shen, and CASTED, our organizing partner.